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Bag Storage of Canola

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Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada

canolacouncil OF CANADA

UNIVERSITY OF MANITOBA

What is the Silobag?

Names

- Grain bag, silobag, harvest bag, grain sausage

Specifications

- Laminated, three layered, UV protected, 9.3 mil (236 µm) thick Polyethylene (PE)

Life of bag

- 1 to 1.5 years

Sealed airtight

- Prevents fungi and insects

Sizes of Silobags?

- 9 ft or 10 ft (2.75 or 3.05 m) diameter
- 200 or 250 ft (≈ 60 or 75 m) length
- Allows 10% stretch
- 9 ft x 200 ft bag weighs 122 kg (270 lbs)

Need for Silobag

Developed in Argentina to:

- **Fill the storage capacity gap**
- **Store dry grain for short duration**
- **Reduce the high cost of transport during Harvest season - field or yard**

Additional Benefits

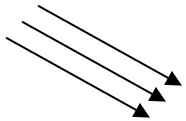
- **Storing a bumper crop**
- **Possibly obtain some extra profit from grain segregation:**
  - **niche crops**
  - **organic crops**
  - **identity preserved storage**

How does it work?

- **Clean ground with good drainage and free of sharp objects**
- **Grain Baggers**
- **Extractors**

Understanding Interactions

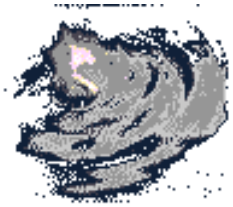
Solar Radiation

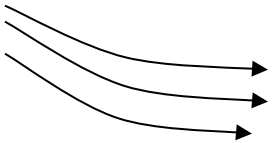


Precipitation

Temperature

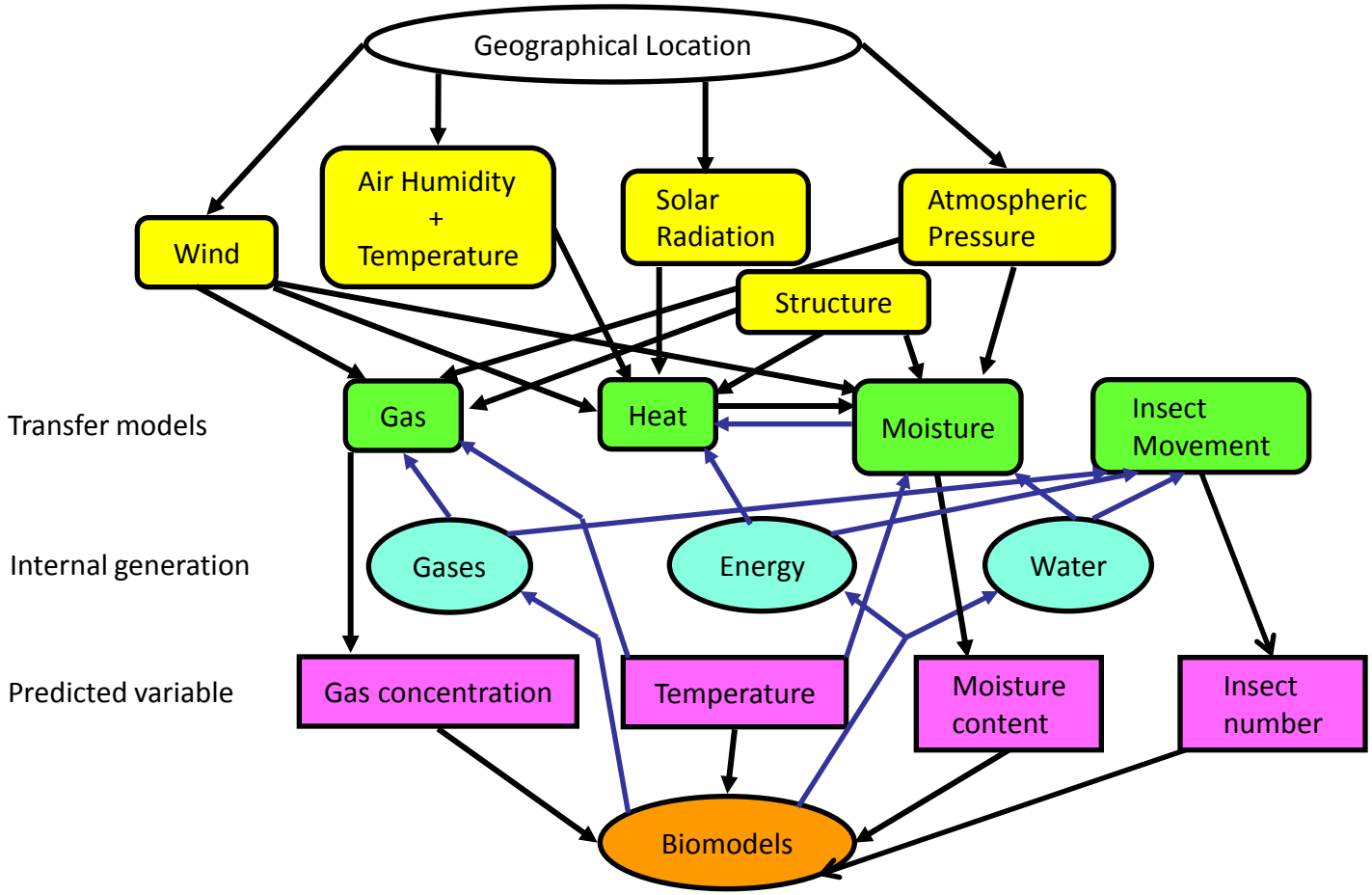
Wind

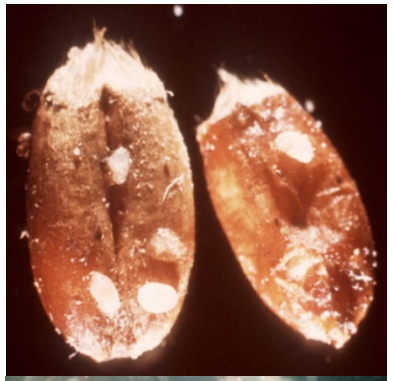




R.H.

Interactions among variables





Limited Evaluation of Silobags Has Been Done

Argentina – wheat and corn

Australia – literature based and farm based with many bags

USA – corn (partial, 2.5 months)

Canada – canola

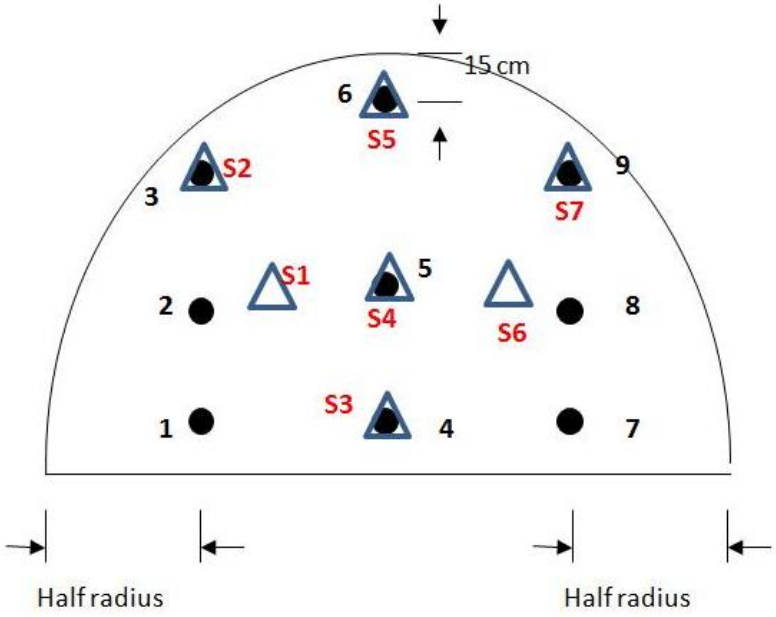
Manitoba Farm Experiences

Source: Scott Day

U of Manitoba Study

- **Three moisture contents**
    - 8, 10 and 14% (wet basis)
    - 3 bags per m.c. (20 t canola in each 20 ft bag)
- Richardson Internationals Ltd Elevator, Dauphin, MB
- **Loaded on October 7&8, 2010**

Sampling locations



Cross sectional view of bag

Seed collection

Temperature & CO_2

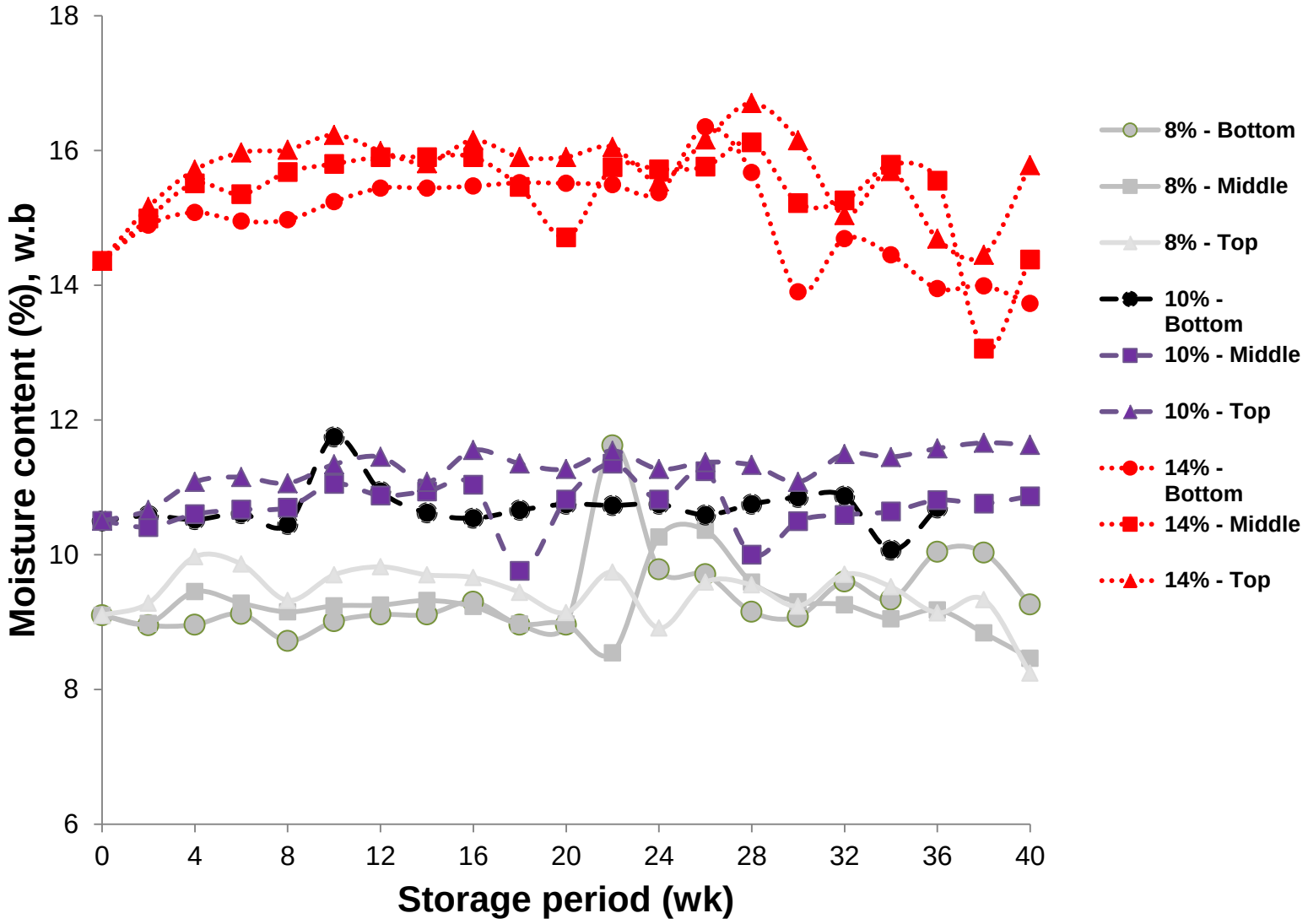
- 7 seed collection locations/ bag
- 10 temperature & CO_2 data/ bag (10th location at the tail of the bag)

Seed Quality Analysis

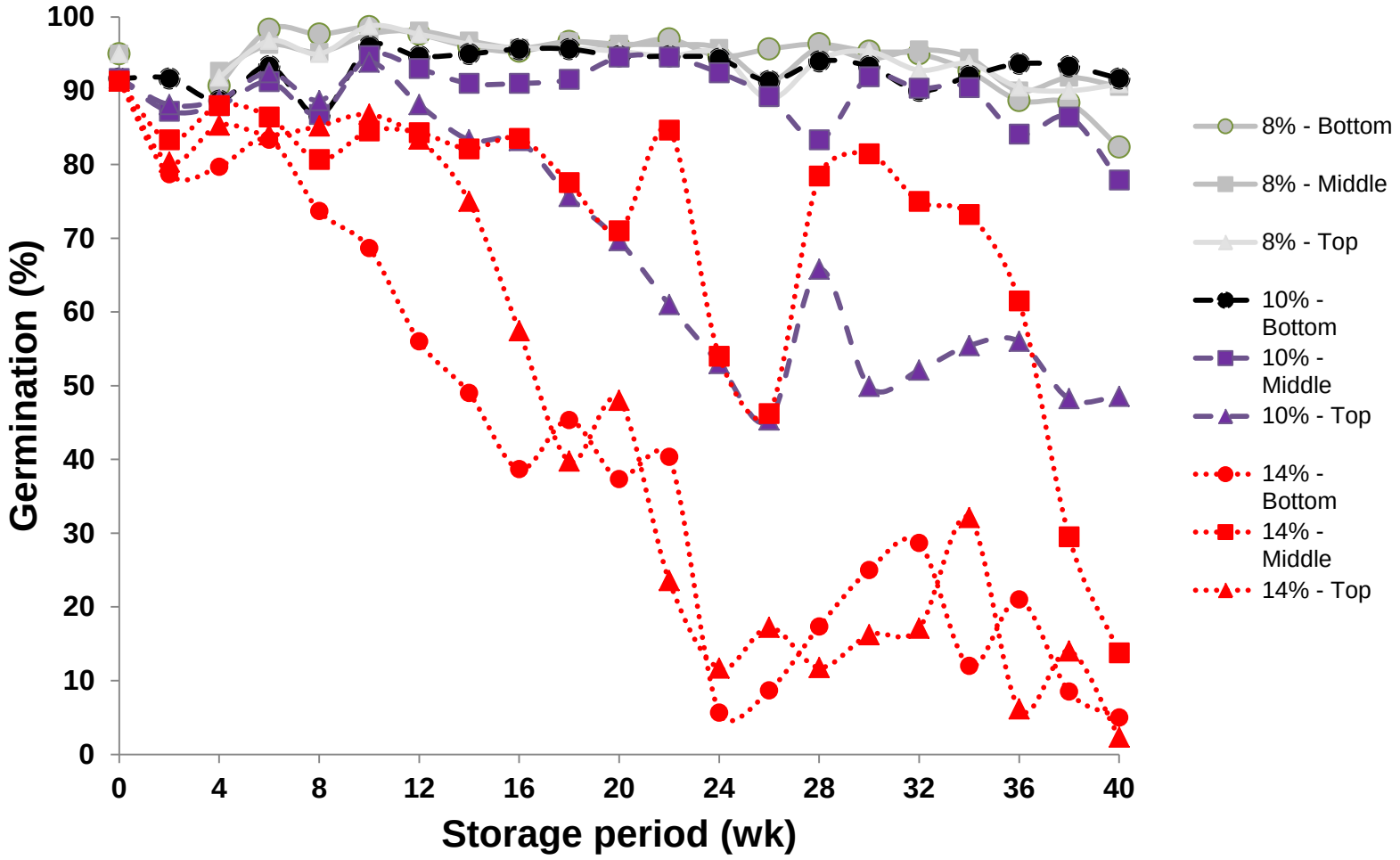
Parameter	Frequency	Testing protocol
Seed germination	2-week	Wallace and Sinha (1962)
Moisture content	2-week	ASAE (2003)
FAV	2-week	AACC (1962)
Intergranular CO_2	2-week	Gas chromatography

2010-11 Results

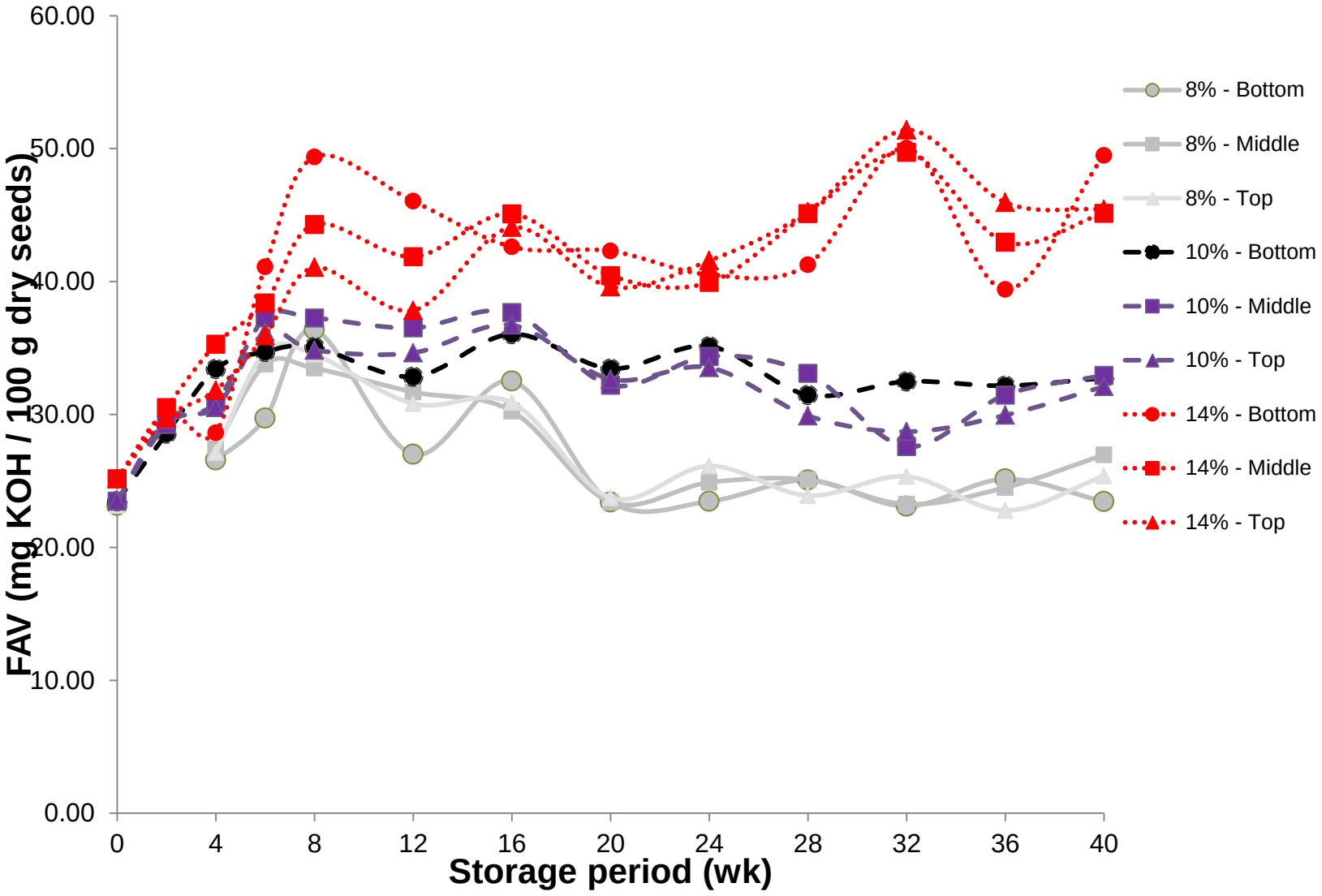
Moisture Content



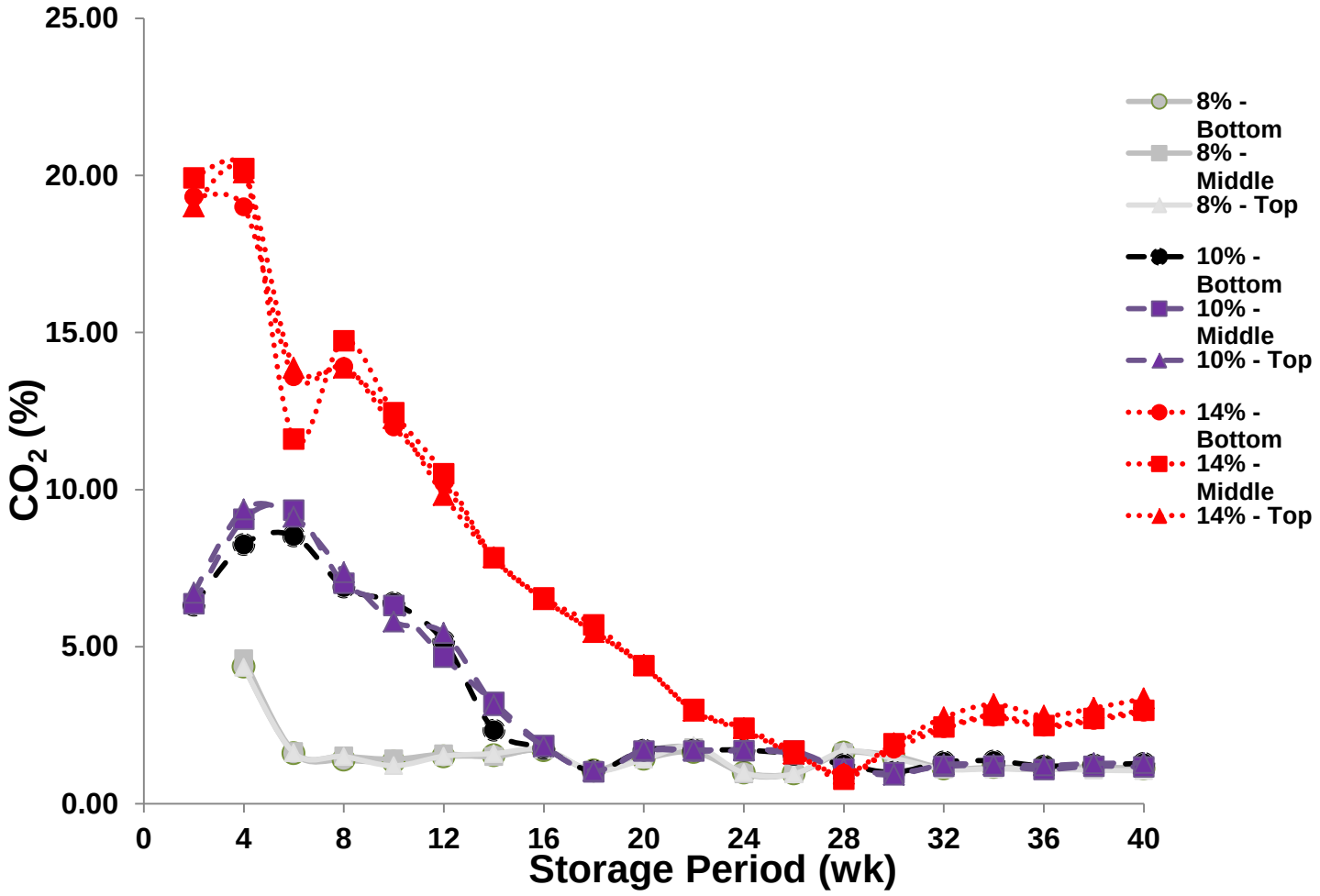
Germination



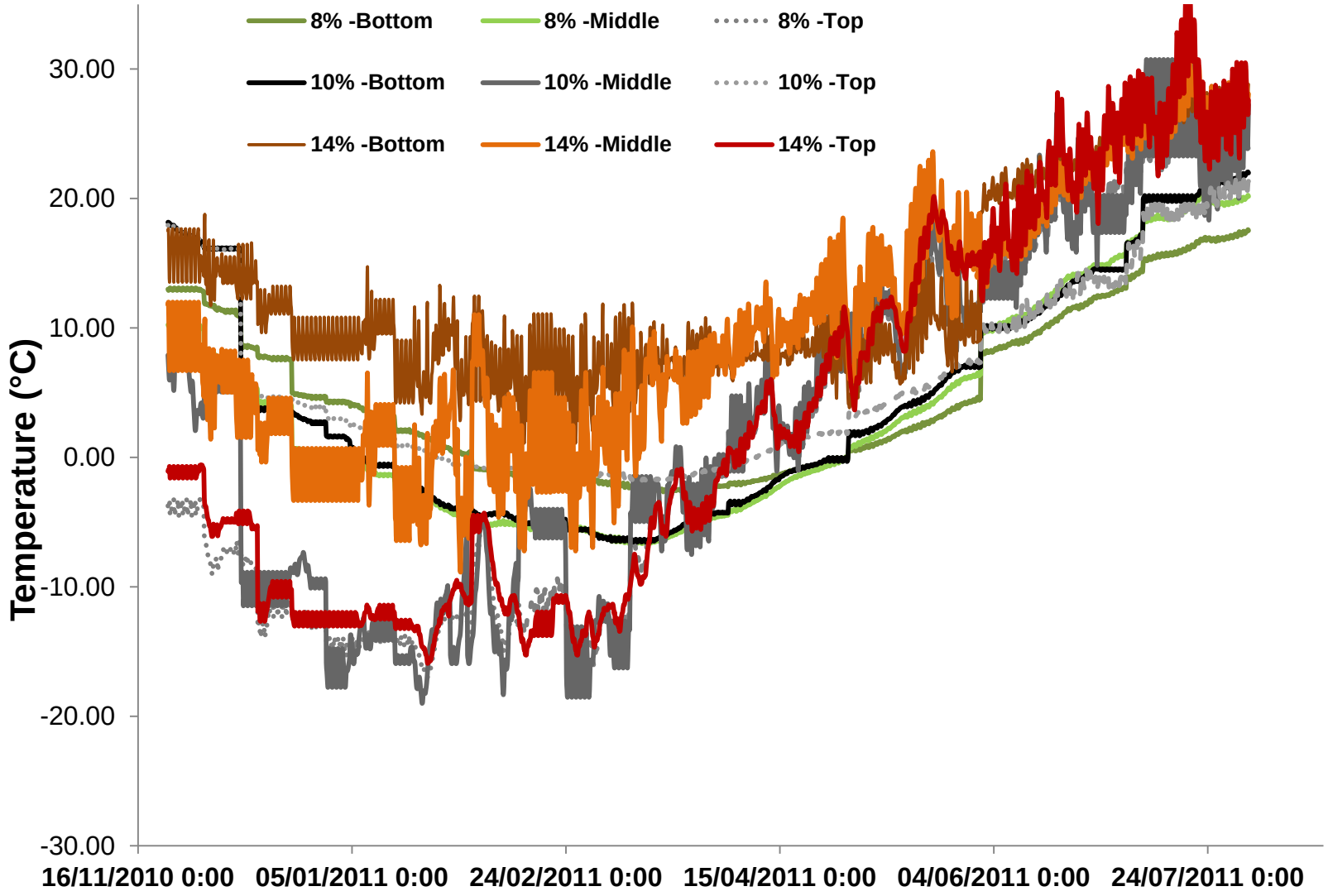
FAV


60.00
50.00
40.00
30.00
20.00
10.00
0.00
FAV (mg KOH / 100 g dry seeds)
0
4
8
12
16
20
24
28
32
36
40
Storage period (wk)
8% - Bottom
8% - Middle
8% - Top
10% - Bottom
10% - Middle
10% - Top
14% - Bottom
14% - Middle
14% - Top

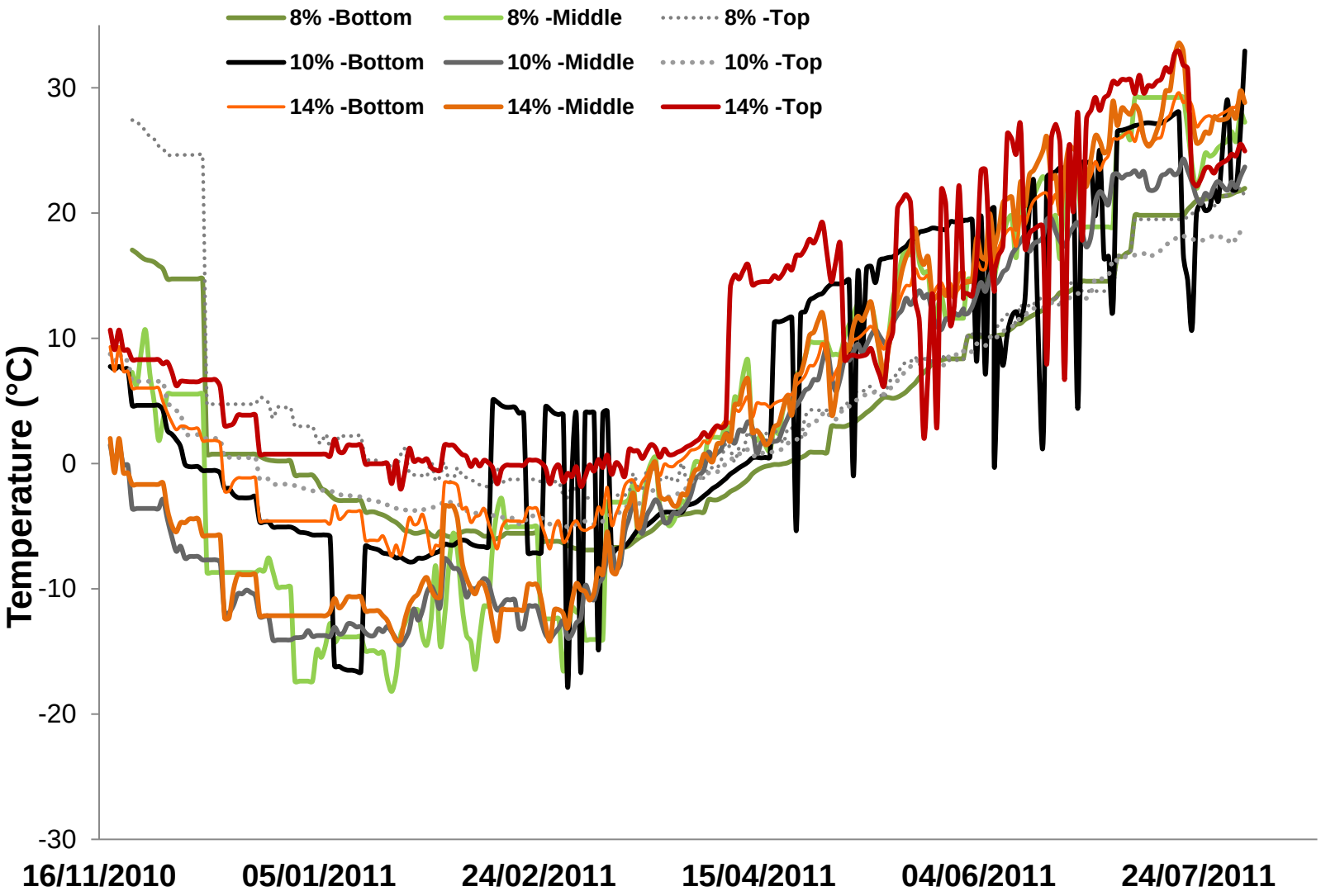
Intergranular CO_2



Temperature



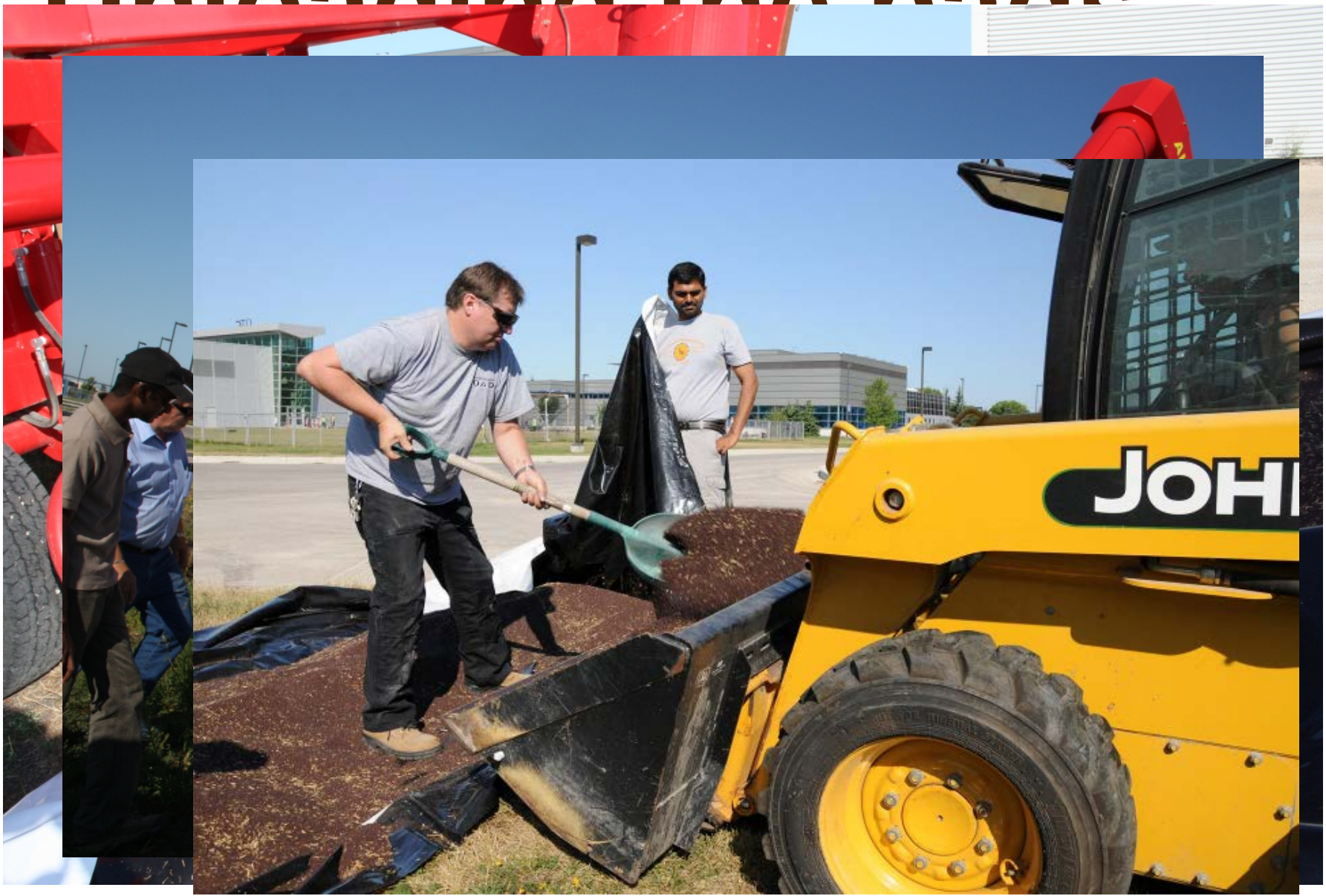
Temperature at Noon



Unloading of Canola

- **Unloaded on August 10,2011**
- **8, 10% m.c. samples**
    - Bag unloader / extractor
- **14% m.c. samples**
    - Caking
    - Front – end loader
    - Animal feed

Unloading the bags



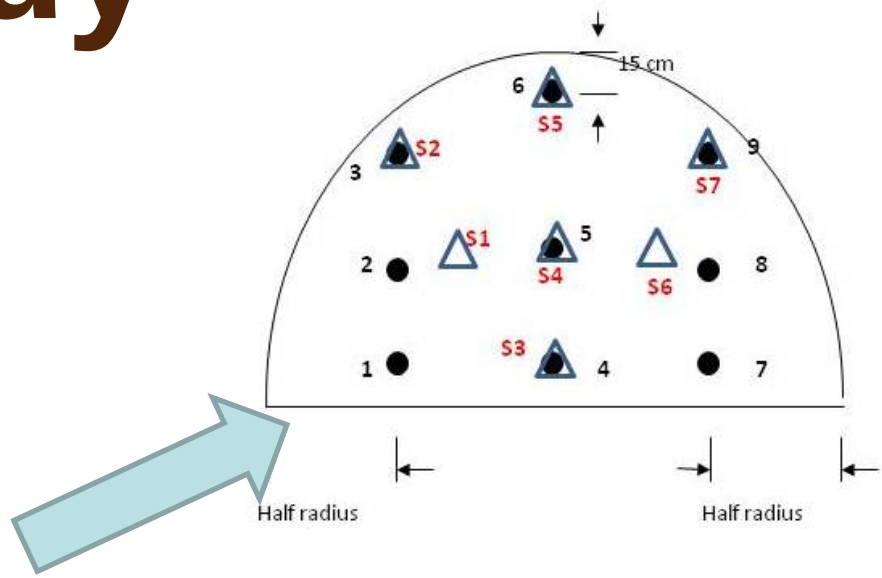
14%

Rodents

2011-12 study

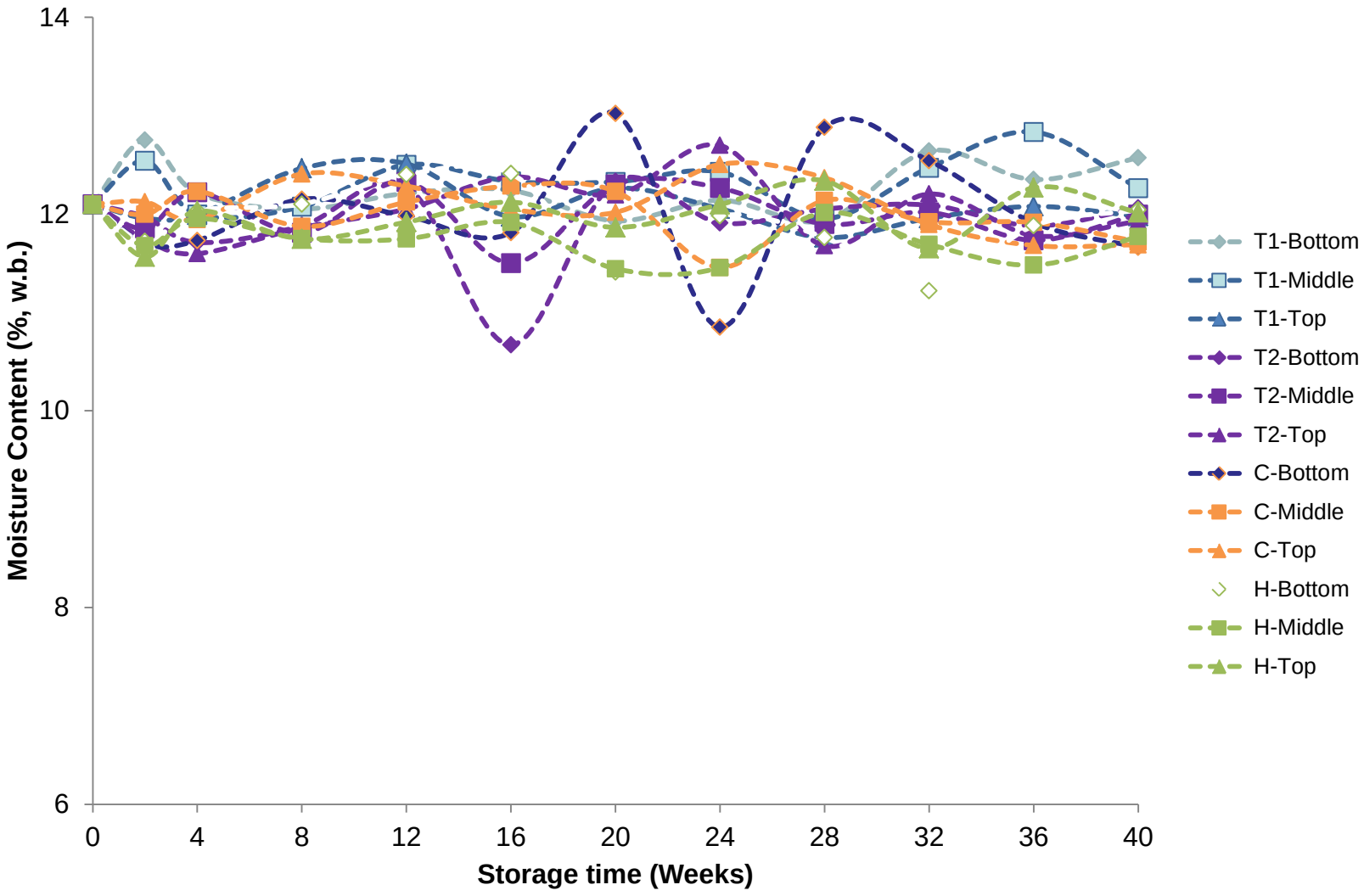
- **12% m.c. canola seeds**
- **3 bags**
    - 70 ft length
    - 67 tonne canola/ bag
- **3 different unloading time**
    - 1st week of March (ground is frozen)
    - Middle of April (ground thawed and accessible)
    - 1st week of August (after summer storage)

2011-12 Study

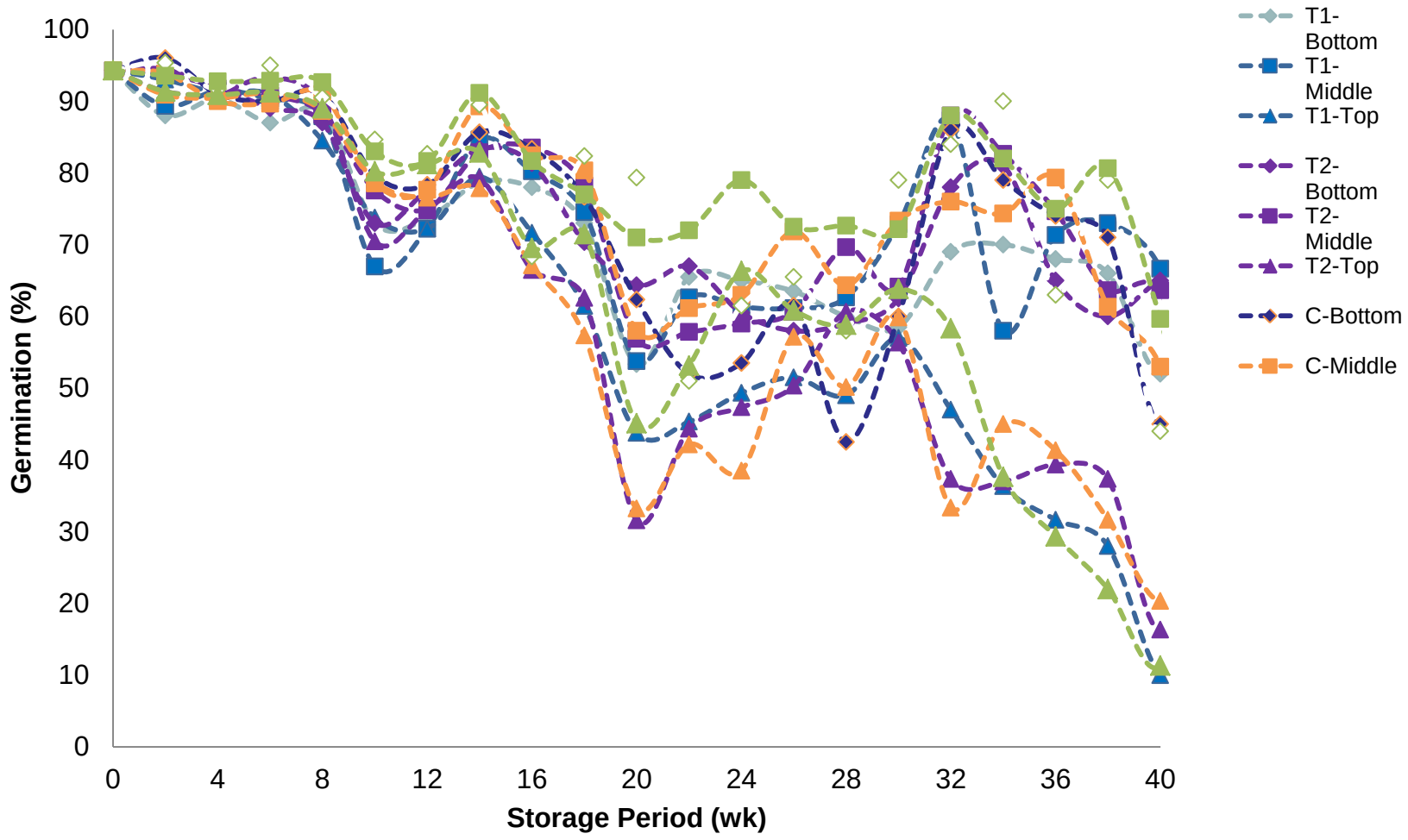


- 28 seed sampling locations/ bag
- 36 temperature and CO_2 samplings locations/ Bag

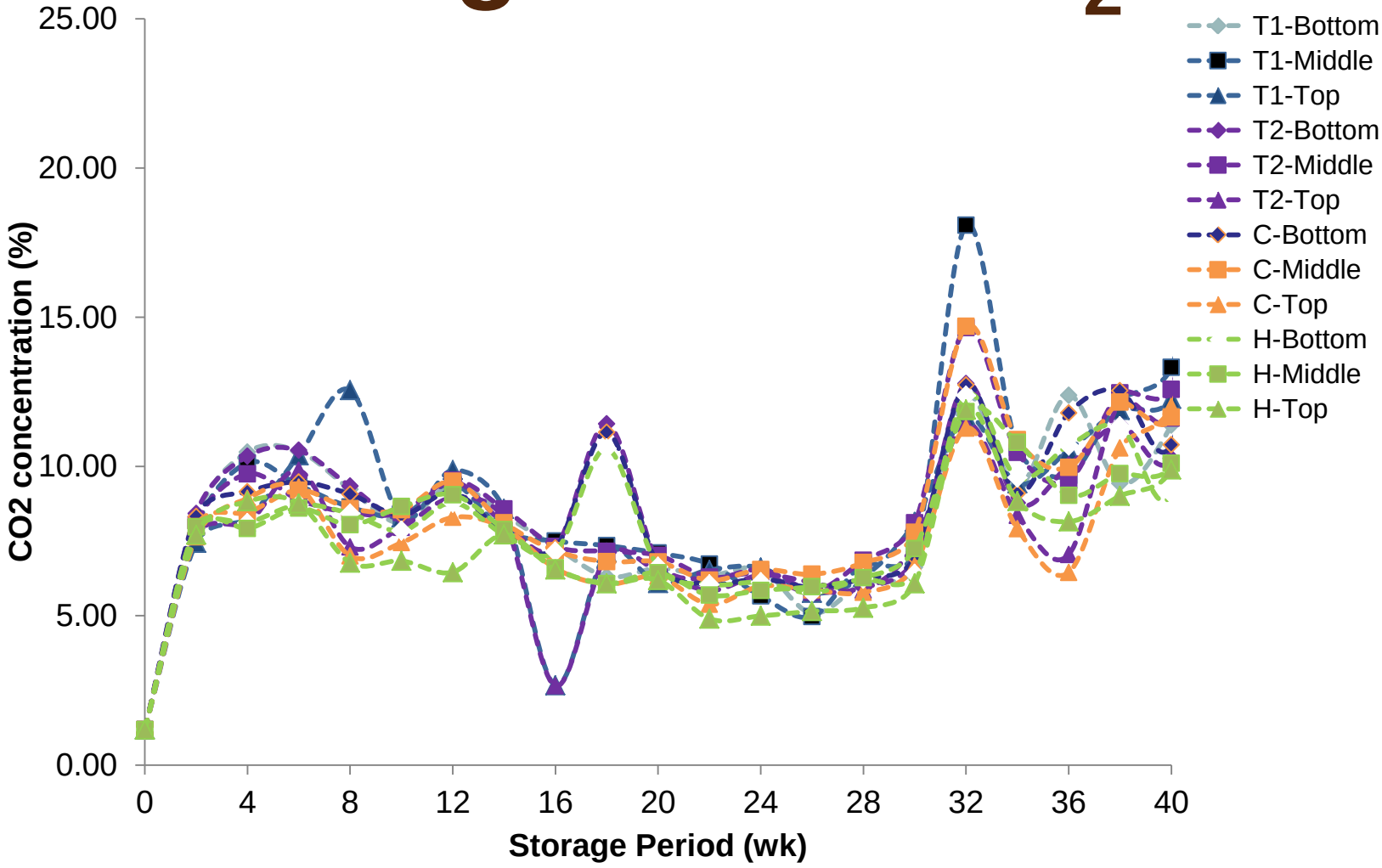
Moisture content



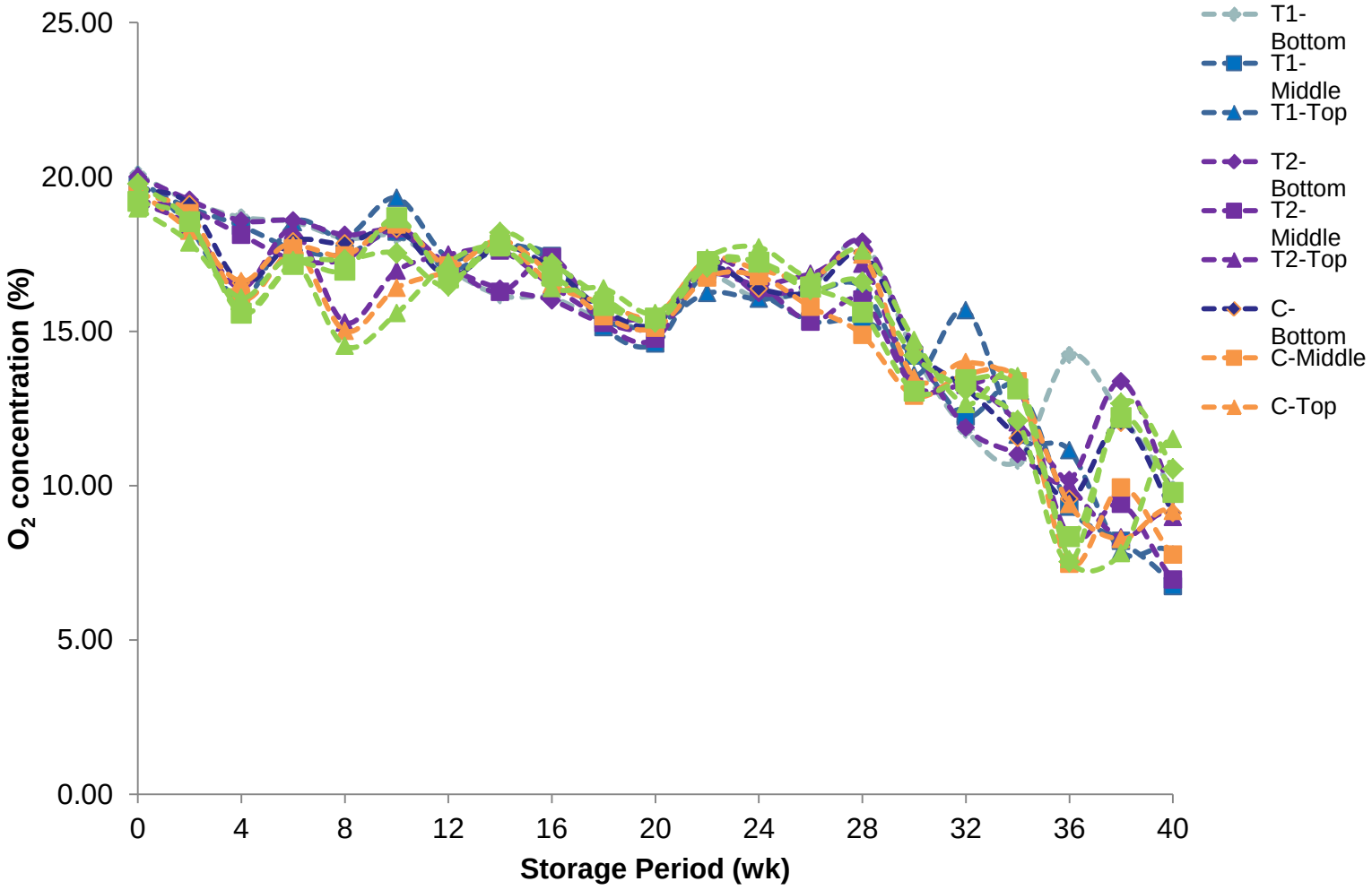
Germination



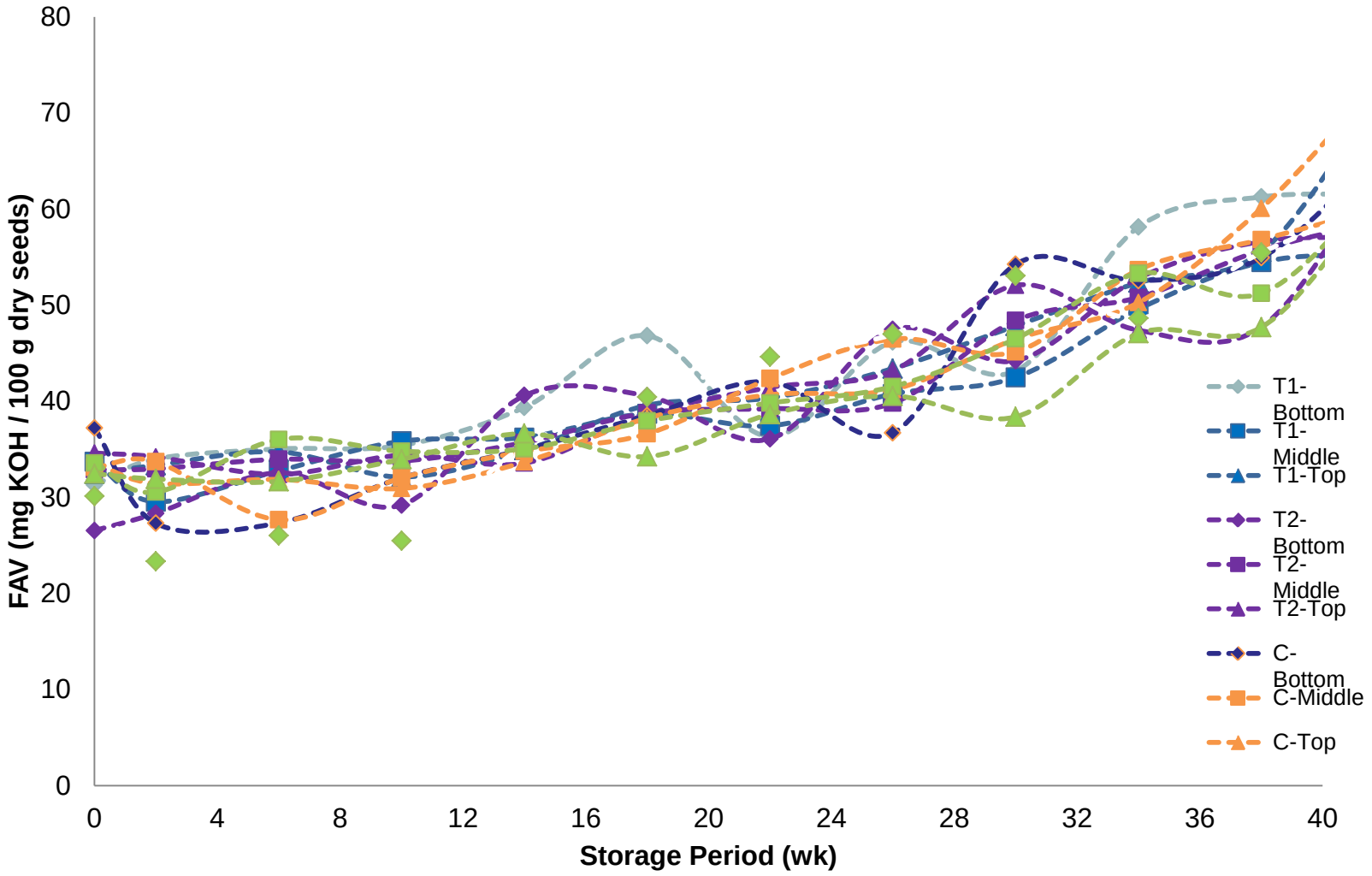
Intergranular CO_2



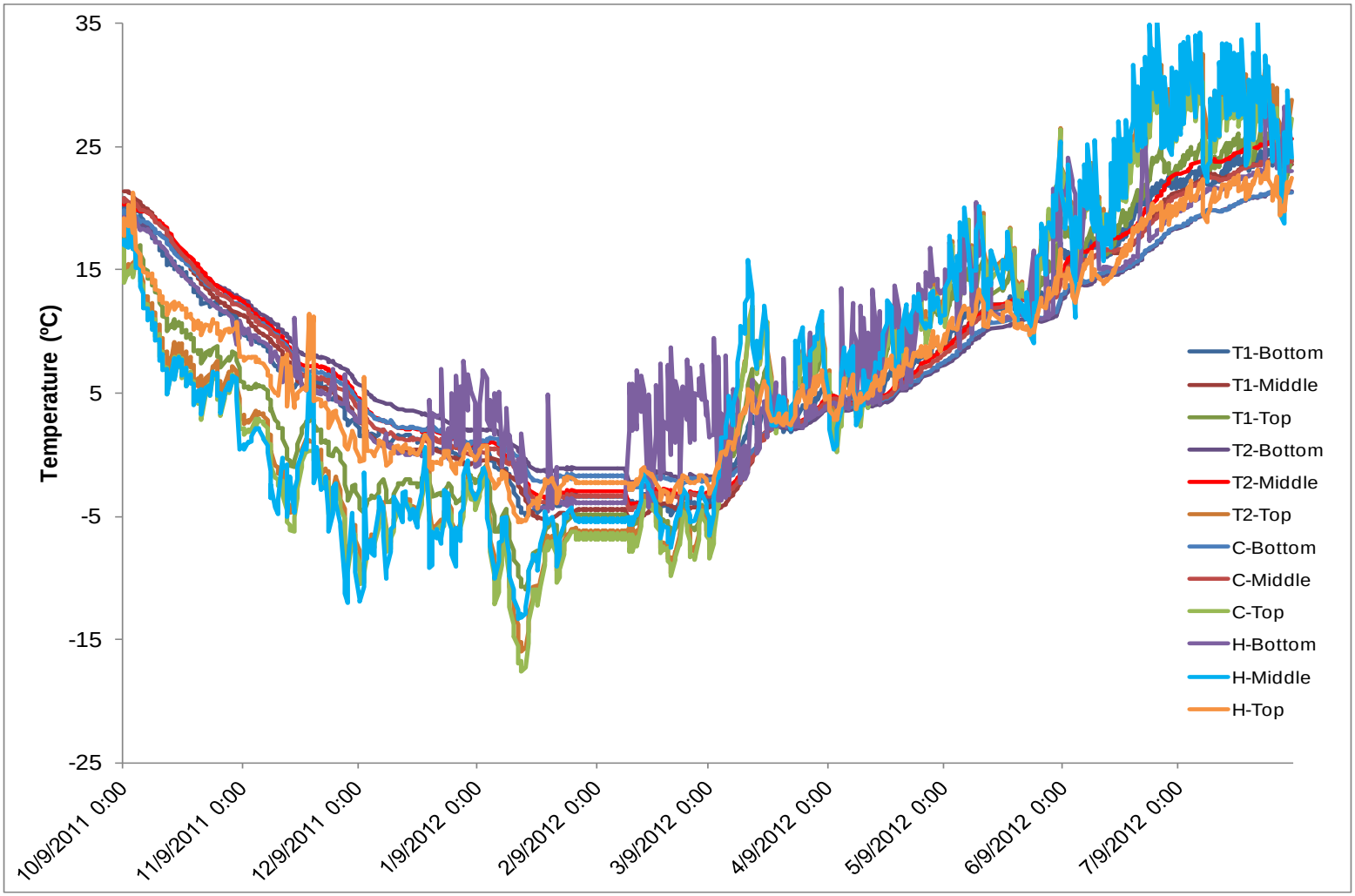
Intergranular O_2



FAV


FAV (mg KOH / 100 g dry seeds)
80
70
60
50
40
30
20
10
0
0
4
8
12
16
20
24
28
32
36
40
Storage Period (wk)
T1-Bottom
T1-Middle
T1-Top
T2-Bottom
T2-Middle
T2-Top
C-Bottom
C-Middle
C-Top

Temperature



Recommendations

- Selection of storage location
    - Drainage
    - Accessibility
    - Crest of hill
    - Away from rodents and animals
    - Pack the ground well
- Unload when ground is still frozen
- Continuous monitoring

Recommendations

- Use only for short term storage
- Maximum storage time
    - Dry seeds (8% m.c.)
        - » 10 months
    - Straight grade seeds (10% m.c.)
        - » 6 months
    - Wet seeds (14% m.c.)
        - » 6 weeks

Questions ?

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